

Application No.: 10/089,869
Filing Date: July 8, 2002
Docket No.: 753-13 PCT/US
Page 5

E. Remarks/Arguments:

Introduction

Claims 1 and 2 were previously cancelled. Claims 3-5 are rejected. Applicant hereby amends claim 3 and had cancelled claim 4.

Applicant respectfully submits that the new claims obviate the Examiner's rejections. Reconsideration and withdrawal of the rejections are respectfully requested.

Section 103 Rejections

Claims 3-5 are rejected under 35 U.S.C. §103(a) as being unpatentable over Patent Number CH 684938 A5 to Gerber (hereinafter Gerber) in view of U.S. Patent No. 5,617,879 to Kubala. (hereinafter Kubala) Applicant respectfully traverses.

Gerber disclose a sealing arrangement to provide an improved sealing effect around a tool shaft or shank inserted in achine tool. In modern machine tools improvement of the sealing effect is necessary for two reasons; 1) the high speed of up to 40,000 rpm would cause typical o-ring seals to be deformed by the centrifugal force and move away from the spinning shaft and therefore cause a leak. 2) due to the high pressure of the coolant even a slight weakness of the sealing can lead to leakage. Gerber discloses providing an improved sealing effect by using highly pressurized cooling fluid to oppose the effect of the centrifugal force by exerting a force opposite the centrifugal force to hold the o-ring in place against the shaft.

Applicant submits that the Examiners interpretation of Gerber is not correct. As previously mentioned, the o-ring is pressed by the coolant towards the tool shaft, not against the side wall of the groove. Moreover, it is not correct, as stated by the Examiner that the space between the opening of the washer and the tool shaft allows the coolant to flow into the groove and build up pressure therein. Firstly, the pressure would be built up between the shaft and the o-ring, thereby pressing it away from the shaft rather than against the shaft, thereby weakening the sealing effect. Secondly, if a tool shaft of maximum diameter is inserted as shown in Fig. 1b of Gerber, there is no space between the washer and the shaft.

Based upon this interpretation the Examiner takes the position that Gerber discloses the present invention except two features, namely: 1) that the groove is wider than the elastic sealing body and 2) that an open annular gap exists between the cylindrical surface and the tool shaft. However, in contrast to the present invention, Gerber does not teach or suggest the fact that the sealing body is pressed against the side wall of the groove. Currently amended independent claim 3 is therefore distinguished from the disclosure of Gerber.

Furthermore, the Examiner has stated that one skilled in the art would have considered the teaching of Kubala with respect to reduced wear and increased lifetime of the seal. However, neither in Gerber nor in the present invention is there any hint to the need for reduced wear and increased life for the seal. In fact, in accordance with the present invention any wear of the sealing o-ring is not a problem as it can be easily replaced, whereas in Kubala, exchanging the o-ring requires that the coolant union be dismantled. Therefore, there would

be no motivation to look to Kubala for teaching on how to reduce wear and increase life of the seal.

Furthermore, the Examiner takes the position that Kubala discloses a gap between the shank and the cylindrical wall. However, the term "gap" is defined in Webster's Seventh New Collegiate Dictionary as a "separation in space". According to this common usage definition of the term "gap", Kubala does not disclose a gap. The carrier 40, is "dimensioned and mounted aligned with the axis of the passageway 42 so as to be capable of sliding axial motion" (col. 6, line 17). Thus, Kubala is describing a sliding seat, the alleged gap is in fact the distance between two contacting surfaces, in effect the "gap" is practically zero.

It is well known in the art that high pressure cannot be maintained in the coolant through such a narrow "gap" as is disclosed in Kubala. Therefore, the sealing body of Kubala cannot be pressed against the side wall by coolant pressure. In contrast, in the present invention, coolant pressure in the groove behind the o-ring is an absolute condition for the sealing effect.

The following tables summarizes the distinctions between the present invention and Kubala;

In the present invention	In Kubala
The sealing washer rotates at a high speed.	The sealing arrangement is stationary
An annular opening exists between the shaft and the washer.	The "gap" 88, is actually not an annular opening because a sliding seat must have a close tolerance fit.
The o-ring is operating under high pressure.	The sealing body is under no pressure because "gap" 88 does not allow pressure build up in the groove.
Wear and longevity of the o-ring is not a problem that needs to be addressed.	Minimization of wear is the main problem that is addressed.
Relative axial movement between the shaft and the o-ring only occurs during the exchange of a tool under no pressure and while the tool is stationary.	There is systematic axial movement during operation.

Thus, the combination of Kubala and Gerber do not disclose and fails to teach or suggest the present invention as defined by amended independent claim 3.

Summary


Therefore, Applicants respectfully submit that amended independent claim 3, is patentably distinct from the cited reference, and is thus allowable. Claim 5, being dependent on independent claim 3 is allowable therewith. Thus, this application is believed to be in condition for allowance. Favorable action thereon is therefore respectfully solicited.

Application No.: 10/089,869
Filing Date: July 8, 2002
Docket No.: 753-13 PCT/US
Page 9

Should the Examiner have any questions or comments concerning the above, the Examiner is respectfully invited to contact the undersigned attorney at the telephone number given below.

The Commissioner is hereby authorized to charge payment of any additional fees associated with this communication, or credit any overpayment, to Deposit Account No. 08-2461.

Respectfully submitted,



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